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Boreoplaca ultrafrigida (*Umbilicariales*), the correct name for *Rhizoplacopsis weichingii*

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Abstract — The type of *Boreoplaca ultrafrigida* is shown to be identical with *Rhizoplacopsis weichingii*. Consequently, the latter name is reduced to synonymy with *B. ultrafrigida*, and *Rhizoplacopsis* is reduced to synonymy with *Boreoplaca*. Systematical position of the genus is discussed on the basis of literature sources. The known distribution of *B. ultrafrigida* in Russia and China is summarized.

Key words — lichen, new synonym, *Ophioparmaceae, Rhizoplacopsidaceae*, biogeography, Asia

A new genus and species *Rhizoplacopsis weichingii*, the only representatives of a new family *Rhizoplacopsidaceae* J.C. Wei & Q.M. Zhou, were recently described from northeast China (Zhou & Wei 2006). Based on the similarity of the ascus apex structure with species of the family *Umbilicariaceae*, supported by ITS, SSU and LSU nrDNA phylogenetic analyses, Zhou & Wei (2007) placed *Rhizoplacopsidaceae* in the order *Umbilicariales* J.C. Wei & Q.M. Zhou.

After a careful examination of the holotype of *Rhizoplacopsis weichingii*, the present authors concluded that it is a synonym of *Boreoplaca ultrafrigida* Timdal, a species found in a few localities in East Siberia and Far East (Russia). Furthermore, the morphological descriptions and data on secondary metabolites of the genus and species in Timdal (1994) and Zhou & Wei (2006) are in close agreement, and coincident parts of nrDNA LSU sequences obtained from authentic material from both Yakutia (*Boreoplaca ultrafrigida*, holotype, Genbank Acc. No. AY853360; paratype, DQ986797) and Jilin (*Rhizoplacopsis weichingii*, holotype, AY530886, submitted as *Rhizoplaca orientalis*) differs in only one base (excluding gaps). Thus, the nomenclature of the genus and species should be treated as follows:

Boreoplaca Timdal, Mycotaxon 51: 503 (1994)

Type: ***Boreoplaca ultrafrigida*** Timdal

=***Rhizoplacopsis*** J.C. Wei & Q.M. Zhou, in Zhou & Wei, Mycosystema 25(3): 381 (2006)

Type: ***Rhizoplacopsis weichingii*** J.C. Wei & Q.M. Zhou.

Boreoplaca ultrafrigida Timdal, Mycotaxon 51: 503 (1994)

Type: **RUSSIA. Yakutia: Ojmyakonsskii Region**: ca. 7 km WSW of Ust'-Nera (64°32'N, 143°08'E) — 500–600 m alt., on boulder in open *Larix* forest, 10.VII.1992, Haugan, R. & Timdal, E. YAK03/39 (**holotype** O L127!).

=***Rhizoplacopsis weichingii*** J.C. Wei & Q.M. Zhou, in Zhou & Wei, Mycosystema 25(3): 381 (2006)

Type — **CHINA. Jilin: Wangqing Co.** (43°21'N, 129°46'E), on stone, 8 June 1996, Wei Jiang-chun, Jiang Yu-mei & Wang You-zhi no 45 (**holotype** HMAS-L 4918!); same locality, on rock, 9.VI.1996, Wei J. C., Jiang Y. M. & Wang Y. Z. no 140 (**paratype** HMAS-L 84923!).

Additional specimens examined — **RUSSIA. Republic Sakha-Yakutia: Ojmakonskii region,** ca. 9 km SW of Ust'-Nera (64°30'N, 143°10'E) alt. 600–800 m, 11.VII.1992, M. P. Zhurbenko 92164 (LE L61), 92159 & 92160 (LE); same region, ca. 8 km SW of Ust'-Nera, (64°31'N, 143°08'E), alt. 600–700 m, 23.VII.1992, M. P. Zhurbenko 92164 (LE); same republic, Verkhoyanskie Mts. opposite mouth of Vilyui River, (ca. 127°N 64°30'E), on stone, 1901, P. V. Olenin (LE). — **Republic Buryatia**: Khamar-Daban Range, Baikal state reserve, headwaters of the Mishikha River, Gladky Range, (51°20'N, 105°28'E) alt. ca. 2000 m, on boulders, 13.VII.1998, I. N. Urbanavichene (LE); same republic, eastern slope of Khambin Range, 8 km NE of Gusinoe Lake, Mt. Ulabortoi (51°20'N, 106°25'E) alt. 800–900 m, on open rocks among taiga forest, 31.VII.1993, M. P. Zhurbenko 9317 (LE L2404). — **Magadanskaya Oblast': Khacynskii region,** ca. 26 km S of Myakit, at the top of the pass on the road to Talaya (61°11'N, 152°06'E) alt. 1050–1100 m, 27.VII.1992, M. P. Zhurbenko 92158 (LE). – Far East, **Primorskii Kray: Lazo region,** Lazovskii state reserve, Sukhoi Log (43°02'N, 133°36'E) alt. 700 m, small ridge with open rock outcrops among taiga forest, on stone, 28.IX.1991, M. P. Zhurbenko 914 (LE, M).

The placement of *Boreoplaca ultrafrigida* in a monotypic family *Rhizoplacopsidaceae* requires further discussion. When discussing affinities of *B. ultrafrigida*, Timdal (1994) mentioned that it was difficult to find a family for the new genus. While the thallus morphology is close to species of traditional *Lecidea* sect. *Psora*, the ascus type resembles that of the *Hypocenomyce friesii*-complex, and the anatomy of the apothecium and the thallus chemistry resemble that of the *H. scalaris*-complex.

The close relationship of *Boreoplaca* to *Ophioparma* and *Hypocenomyce scalaris* was supported by molecular phylogenetic analyses based on mtSSU/nLSU rDNA (Wedin et al. 2005) and on the multilocus dataset (Miadlikowska et al. 2006). As mentioned by Wedin et al. (2005), *Boreoplaca, Ophioparma* and *H. scalaris* have similar asci. The amyloid reaction pattern of the ascus tips is a valuable taxonomic marker often correlating with molecular data within *Lecanoromycetes* (Peršoh et al. 2004). The presence of amyloid asci with a tholus

exhibiting a strongly amyloid dome in a monophyletic group, supported by the results of the molecular phylogenetic analyses, was used to suggest the extension of the family *Ophioparmaceae* R.W. Rogers & Hafellner (Miadlikowska et al. 2006). Nevertheless, the *Ophioparmaceae* needs additional investigation, since according to the cladograms presented in the above-cited publications, it may include *Ophioparma* and *Hypocenomyce scalaris*, *Ophioparma* and *Boreoplaca*, or all three taxa, the genera of which are clustered within the *Fuscideaceae-Umbilicariaceae* clade (Miadlikowska et al. 2006). However, some taxa related to *Umbilicariaceae* were not included in this study. *Elixia* forms a sister group to *Umbilicariaceae* in Bayesian analyses of nuclear and mitochondrial DNA (Lumbsch et al. 2004). Moreover, *Hypocenomyce friesii,* which has an ascus type similar to *Boreoplaca*, clusters with high support in *Umbilicariaceae* sequences (Wedin et al. 2005), but was not included to the data set by Miadlikowska et al. (2006). Consequently, the relation of *Ophioparmaceae* with *Elixia* and the *Hypocenomyce friesii*-complex remains unclear.

Despite the fact that the current family (*Rhizoplacopsidaceae* or *Ophioparmaceae*) for *Boreoplaca* seems uncertain, the placement of the genus within *Umbilicariales* as suggested by Zhou & Wei (2006) and Miadlikowska et al. (2006) and formally described in Zhou & Wei (2007) looks plausible, because phylogenetic analyses based on different genes consistently place *Boreoplaca* in the monophyletic groups sister to *Umbilicariaceae*-clade; furthermore, *Boreoplaca* has asci similar to asci in representatives of *Umbilicariaceae*.

The above work extends our knowledge of the distribution of *Boreoplaca ultrafrigida* (Fig. 1), which was previously known only from Russia: Chersky Range (NE Yakutia) (Timdal 1994), Verkchoyansky Range (LE), Southern (Urbanavichene & Urbanavichus 1999) and Eastern (Budaeva & Kharpukhaeva 2003) Baikal region, Khentei-Chikoi Upland (Urbanavichus & Urbanavichene 2002), Stanovoye Upland (Makryi 2002; Kharpukhaeva et al. 2004), and Sikhote-Alin' Range (Zhurbenko 2003). The locality in China is the most southerly finding of *B. ultrafrigida*.

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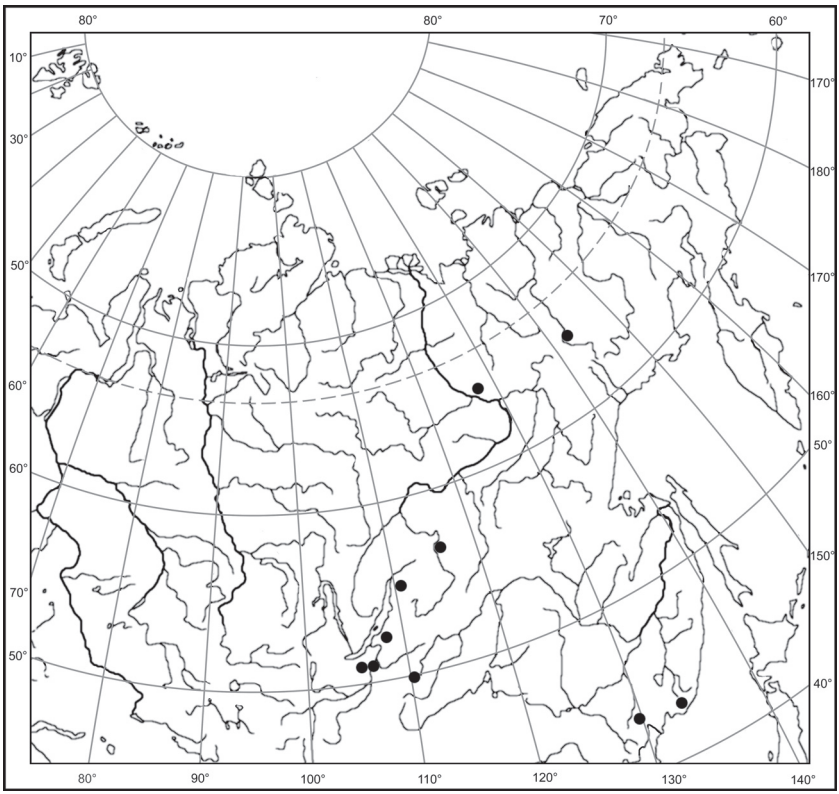

Figure 1. Distribution map of *Boreoplaca ultrafrigida* based on investigated specimens and literature data.

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